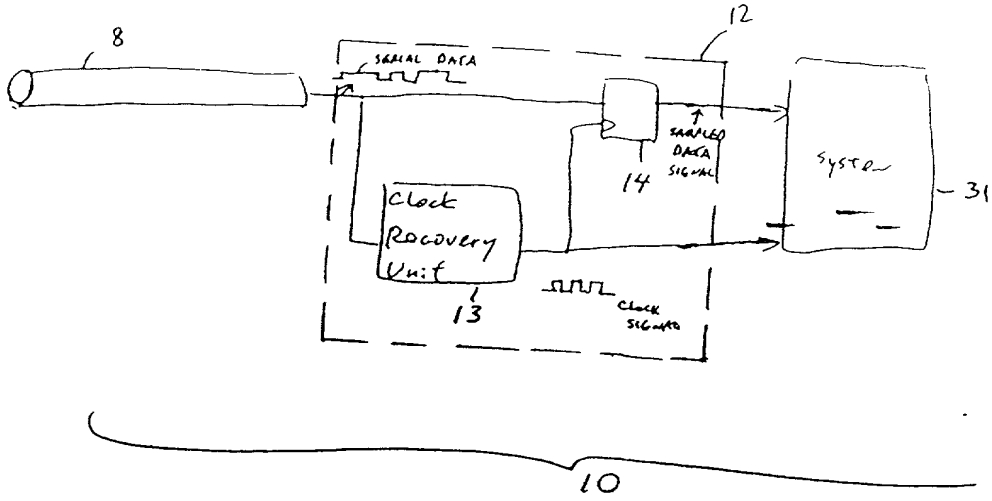
FIG 1 PRIOR ART



PRIOR ART

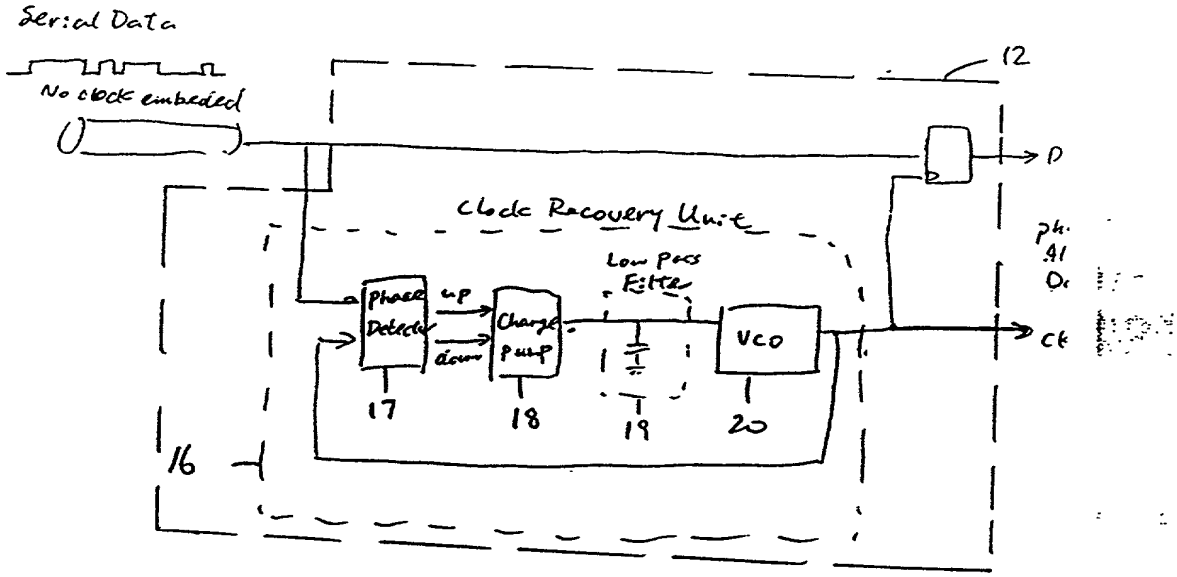


FIG. 2

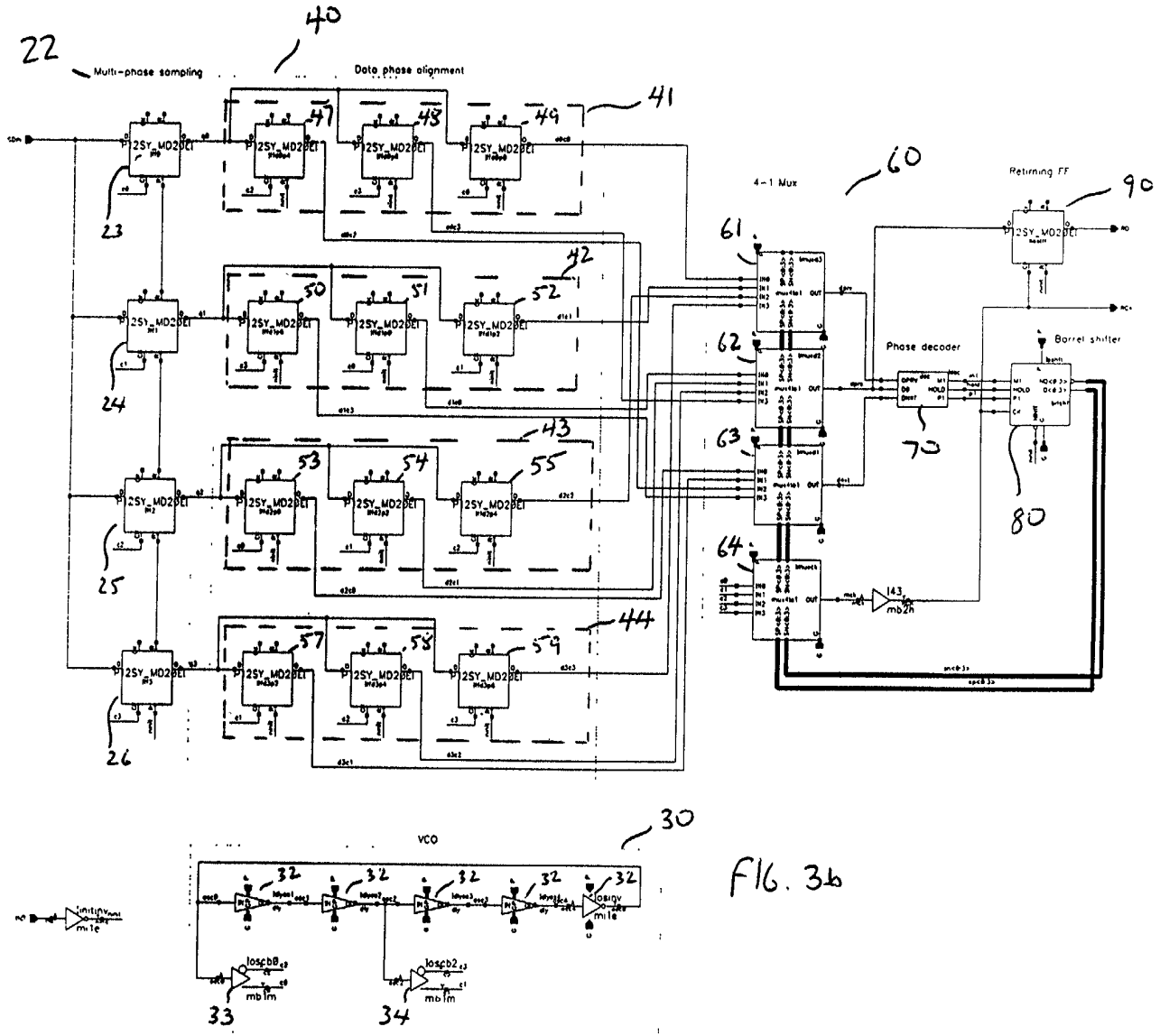


FIG 3a

FIG. 3b

FIG. 4

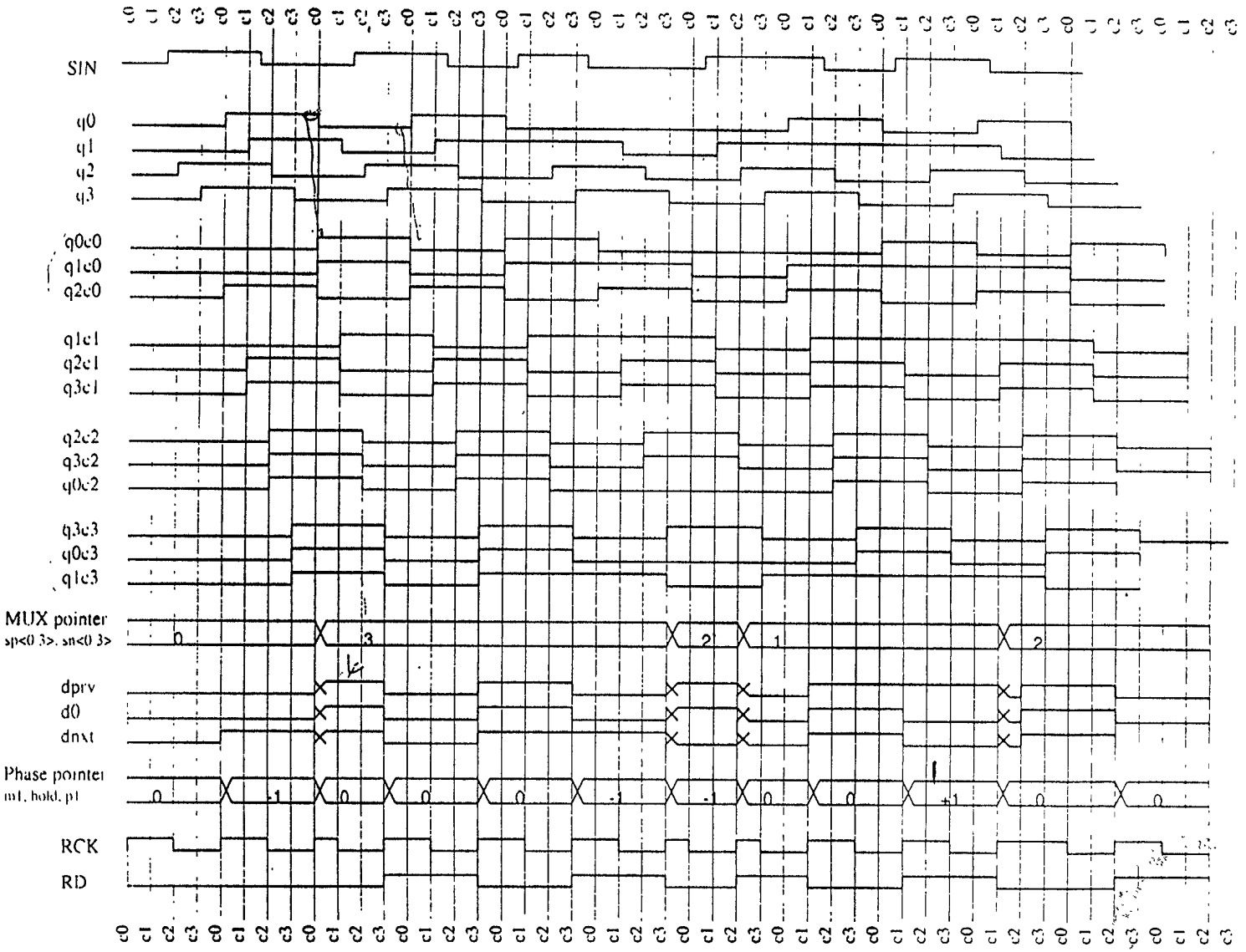

SIN
q0
q1
q2
q3
q0c0
q1c0
q2c0
q1c1
q2c1
q3c1
q2c2
q3c2
q0c2
q3c3
q0c3
q1c3
MUX pointer
sp<0:3>, sn<0:3>
dprv
d0
dnxt
Phase pointer
m1, hold, p1
RCK
RD

FIG. 6

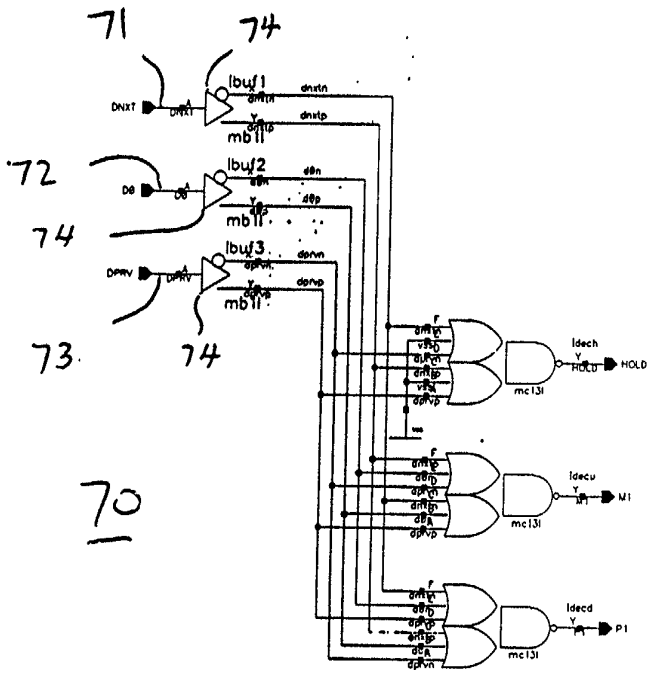


FIG. 5

DPRV	D0	DNXT	M1	HOLD	P1
H	H	L	H	L	L
L	L	H	H	L	L
H	H	H	L	H	L
L	L	L	L	H	L
H	L	L	L	L	H
L	H	H	L	L	H

FIG. 7

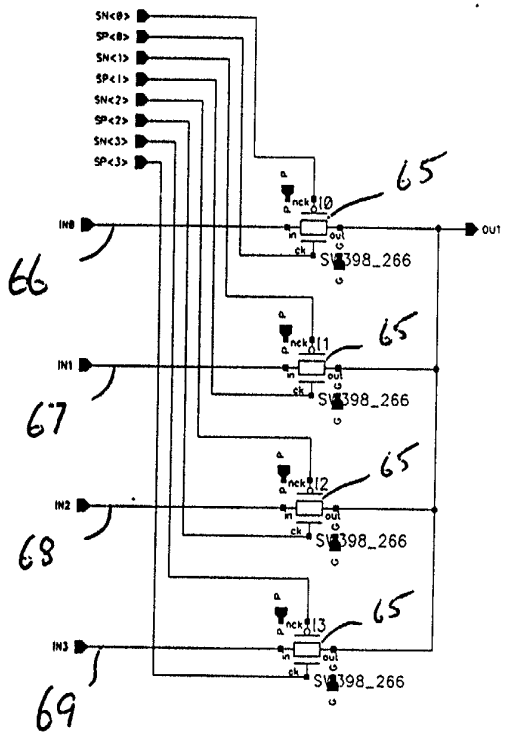

SN<0>
SP<0>
SN<1>
SP<1>
SN<2>
SP<2>
SN<3>
SP<3>
IN0
IN1
IN2
IN3
OUT
nck_I0
nck_I1
nck_I2
nck_I3
SW398_266
65
66
67
68
69

FIG. 8

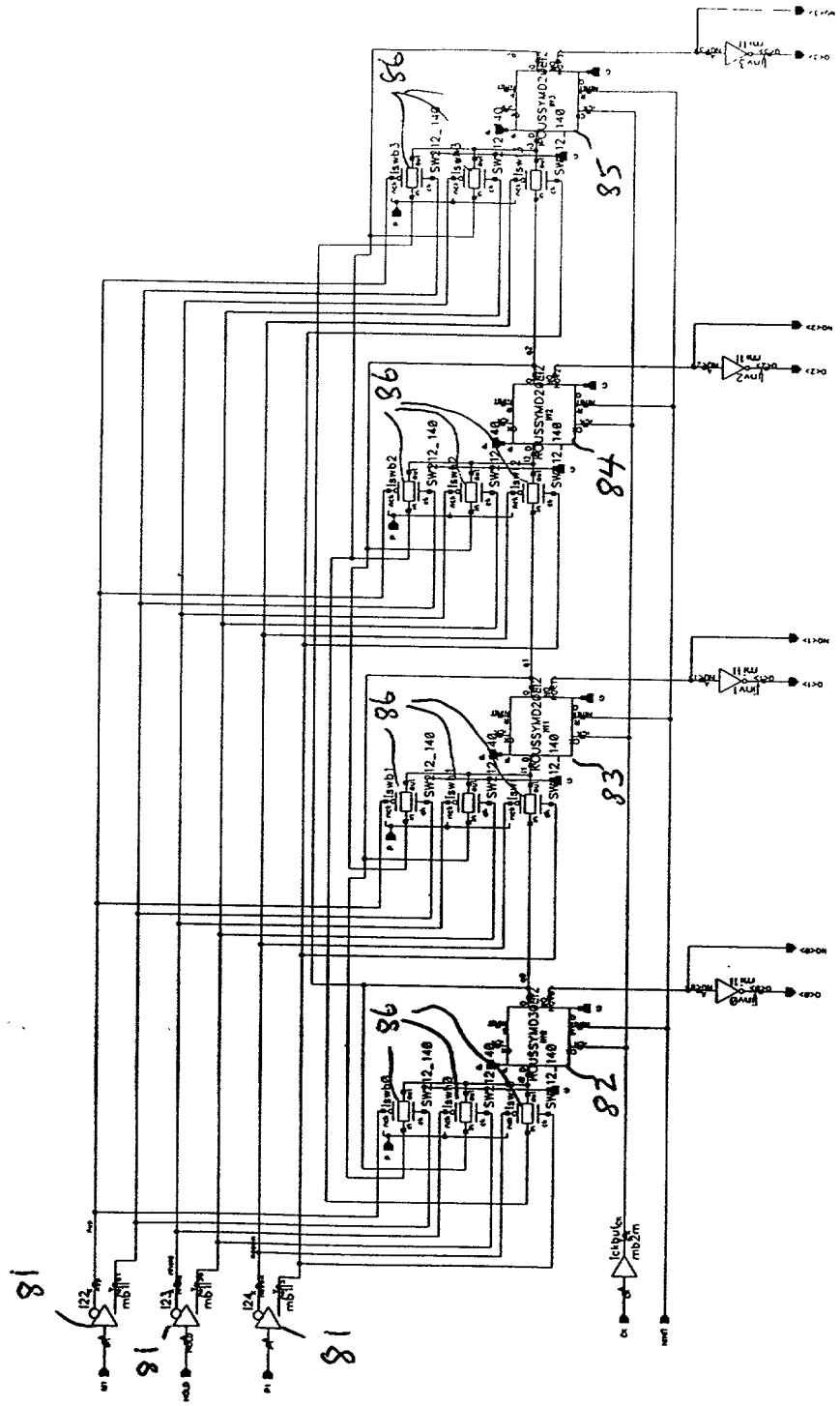


FIG. 9a

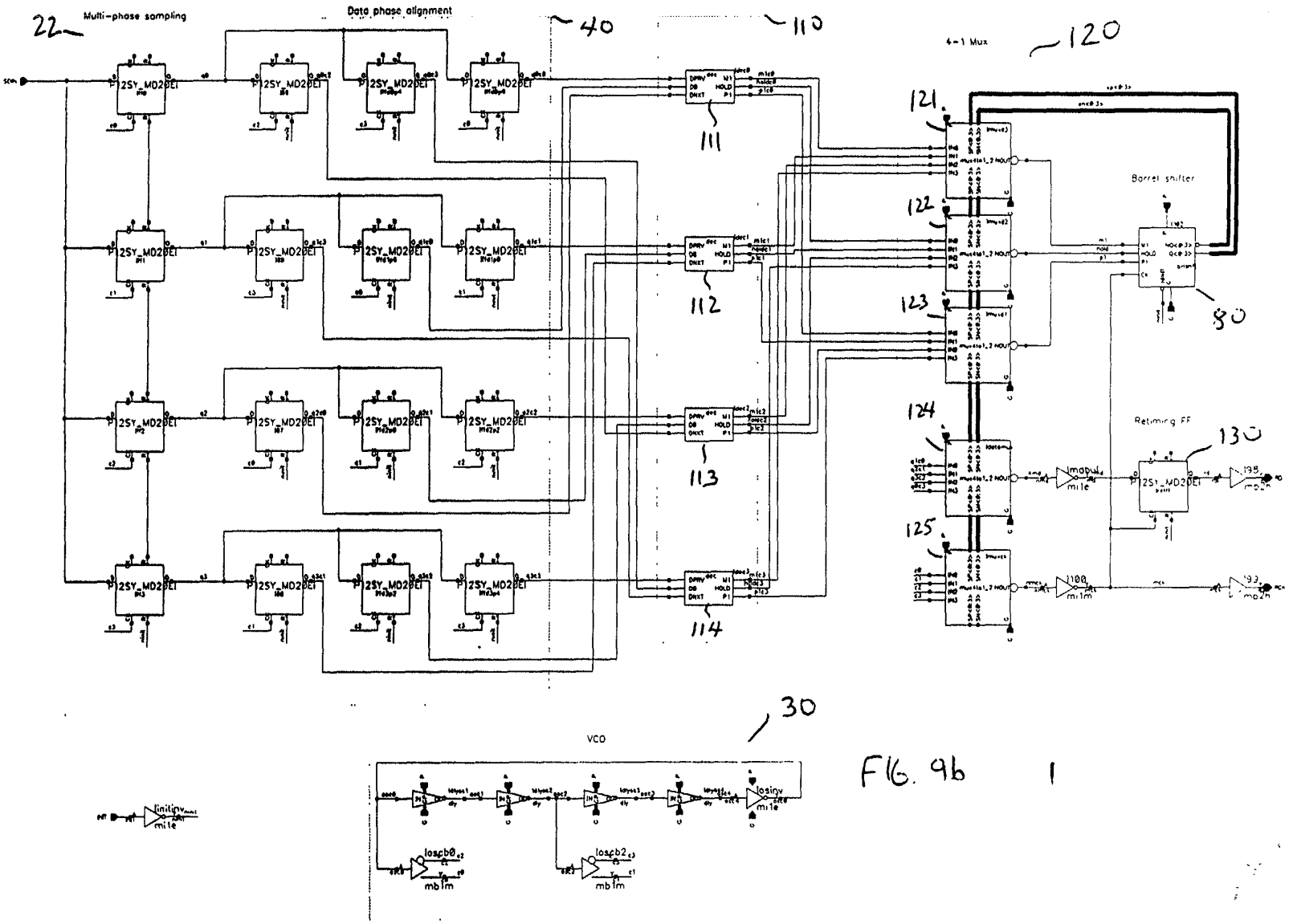

22
Multi-phase sampling
Data phase alignment
40
110
4-1 Mux
120
111
112
113
114
121
122
123
124
125
Barrel shifter
80
Retiming FF
130
30
VCO

FIG. 9b

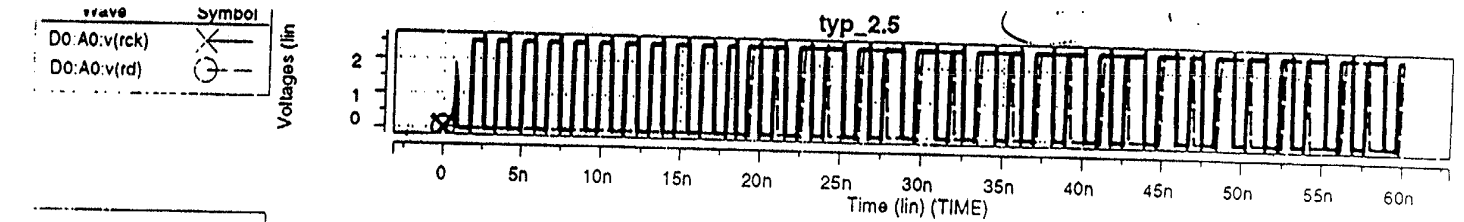


FIG. 10a

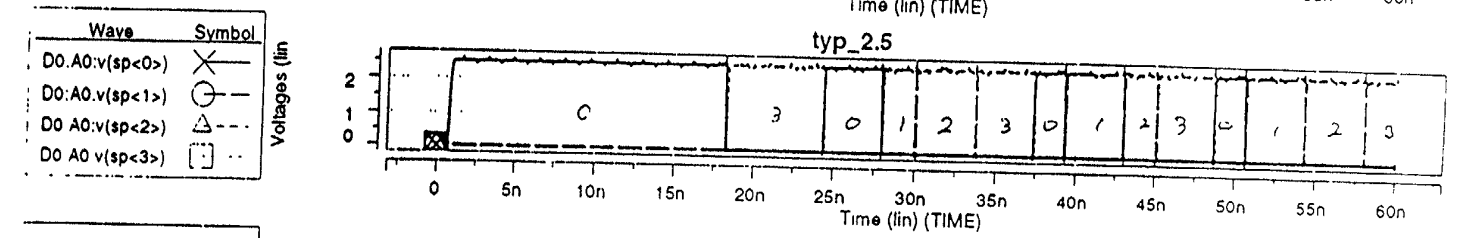


FIG. 10b

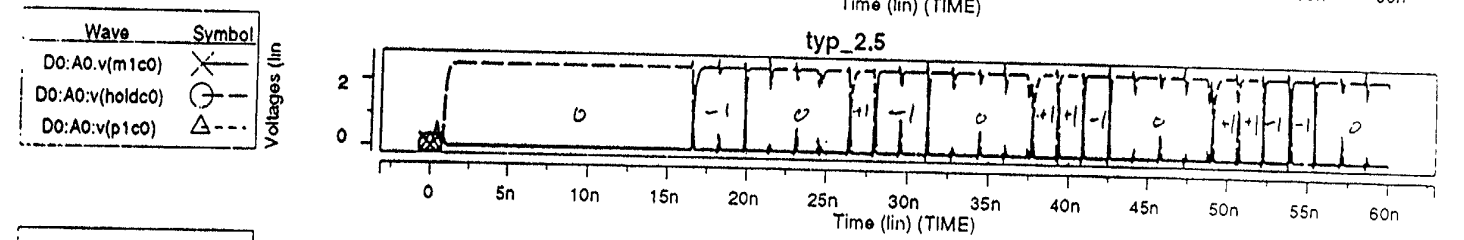


FIG. 10c

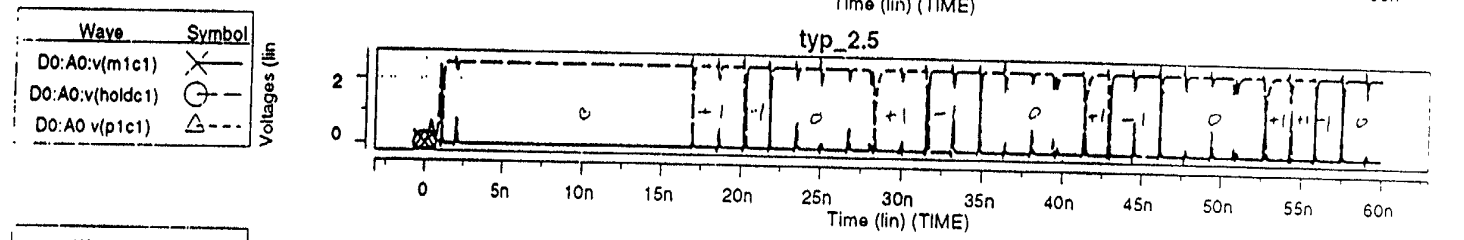


FIG. 10d

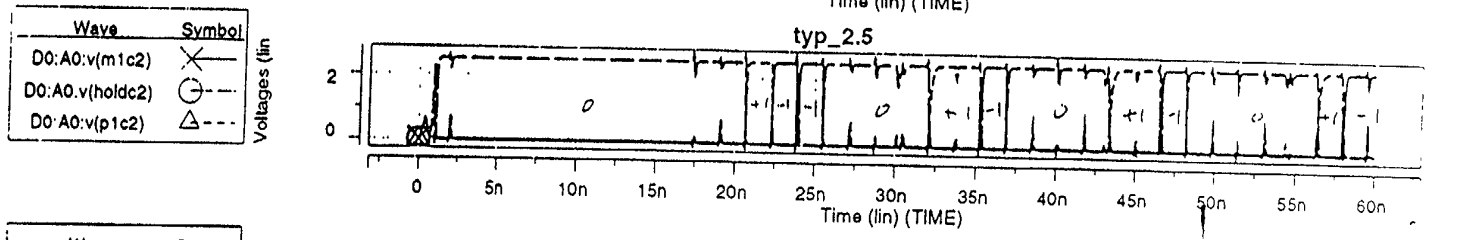


FIG 10e

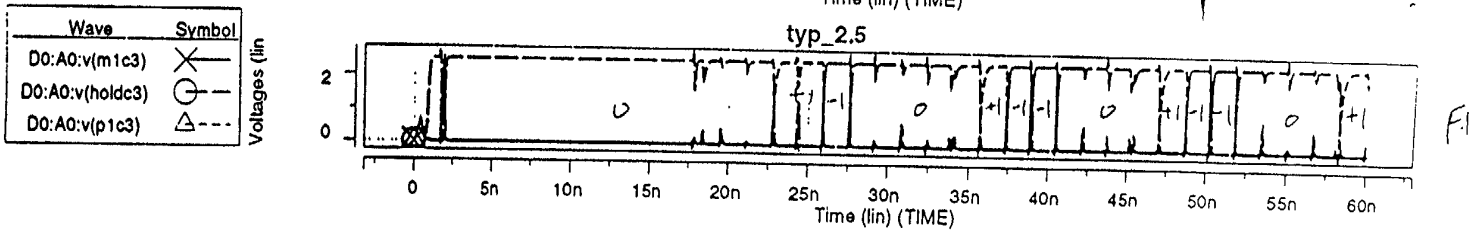
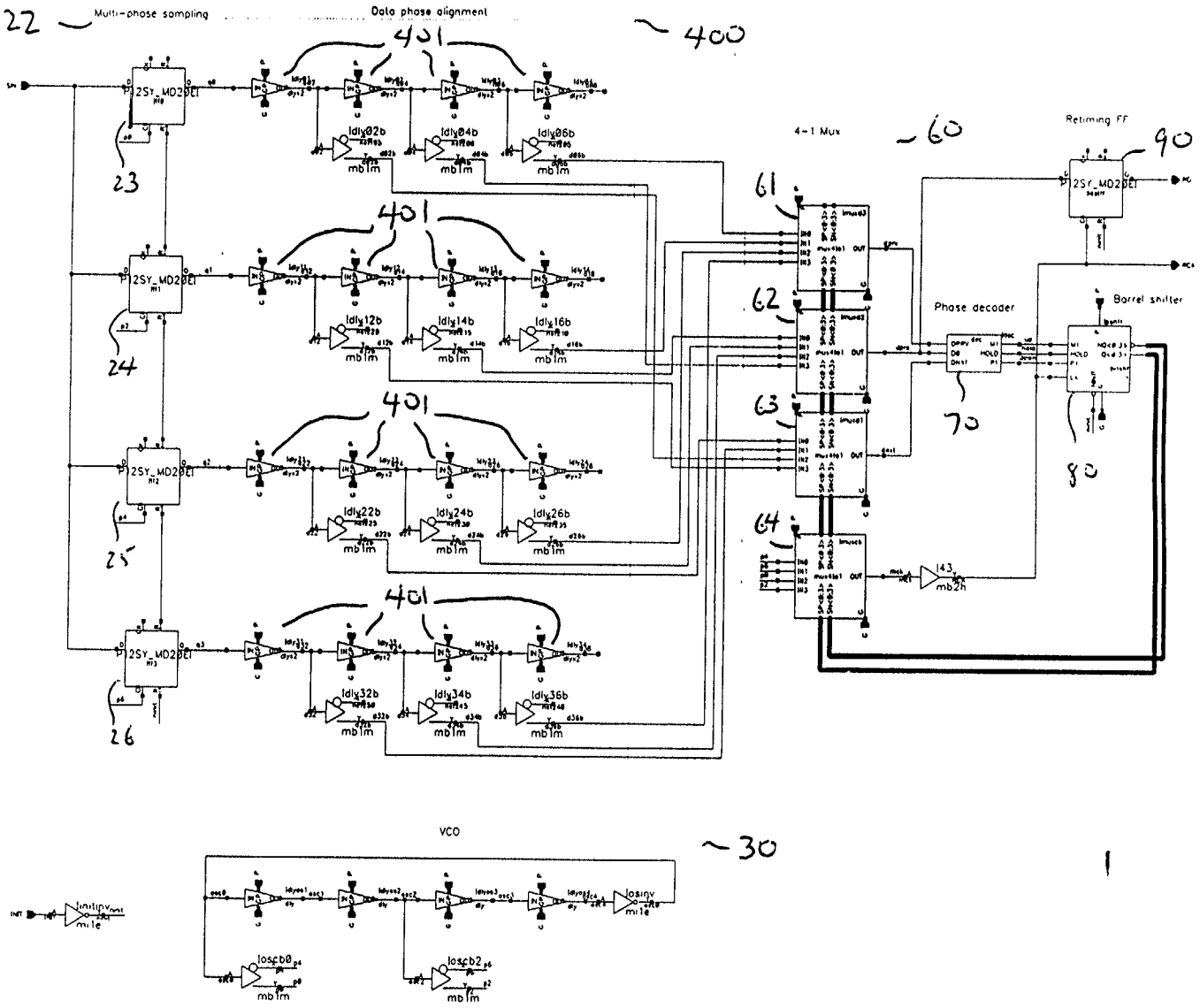


FIG 10f

FIG. 11


22
Multi-phase sampling
Data phase alignment
400
401
401
401
401
23
24
25
26
4-1 Mux
60
61
62
63
64
Retiming FF
90
Phase decoder
70
Barrel shifter
80
VCO
30
1

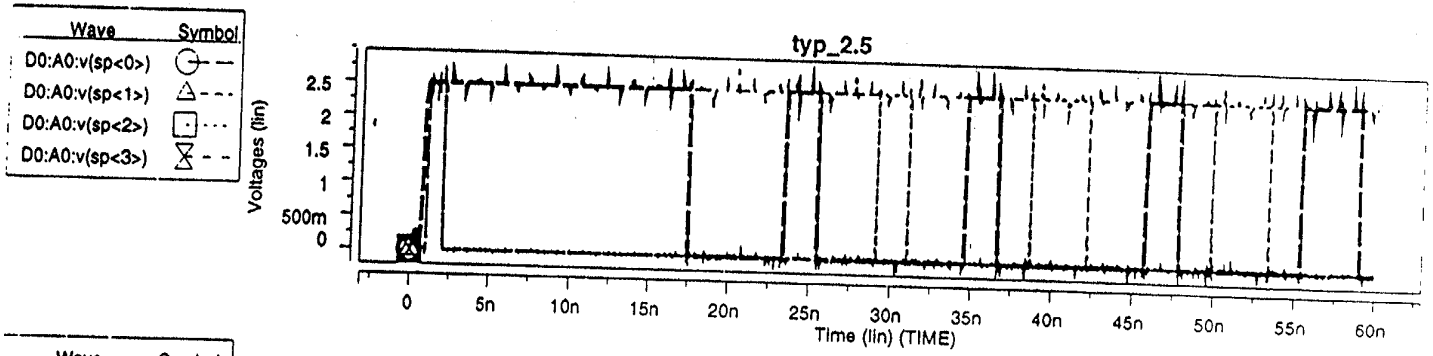


FIG 12a

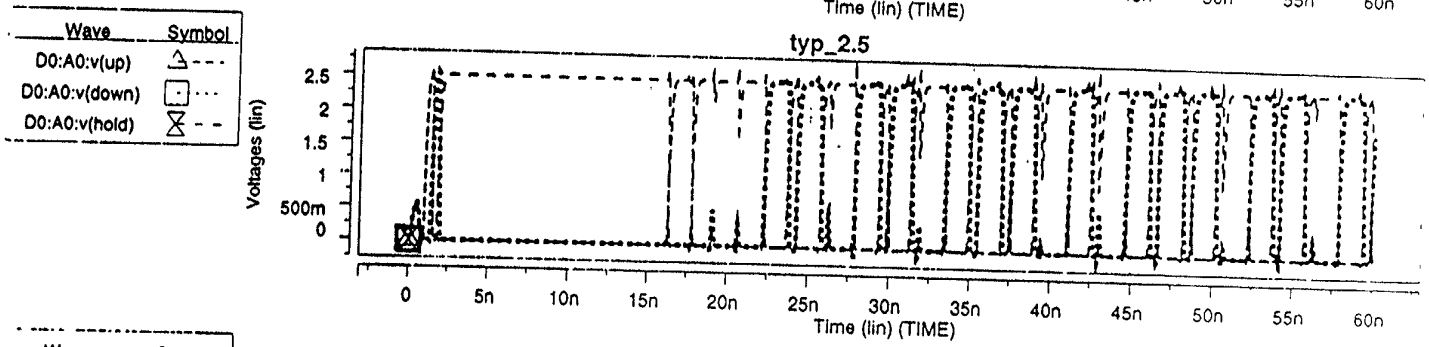


FIG 12b

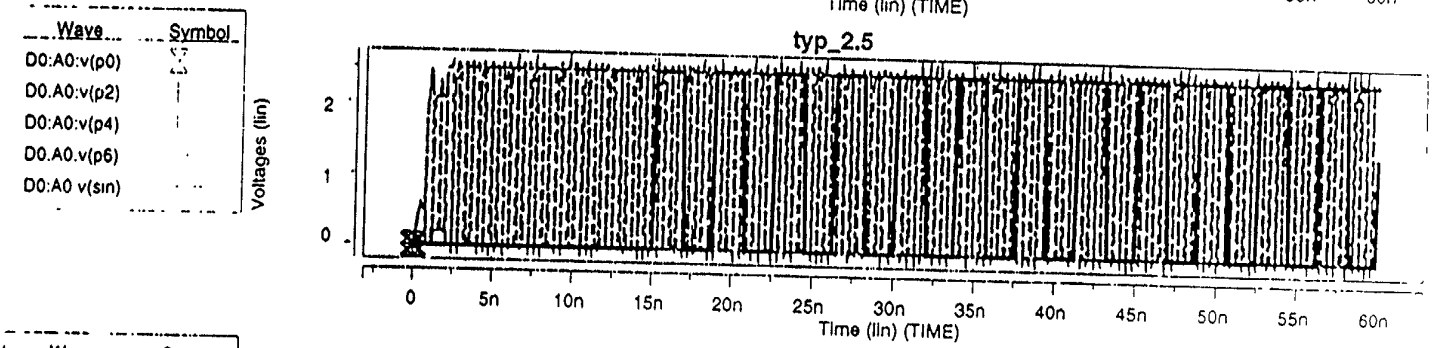


FIG 12c

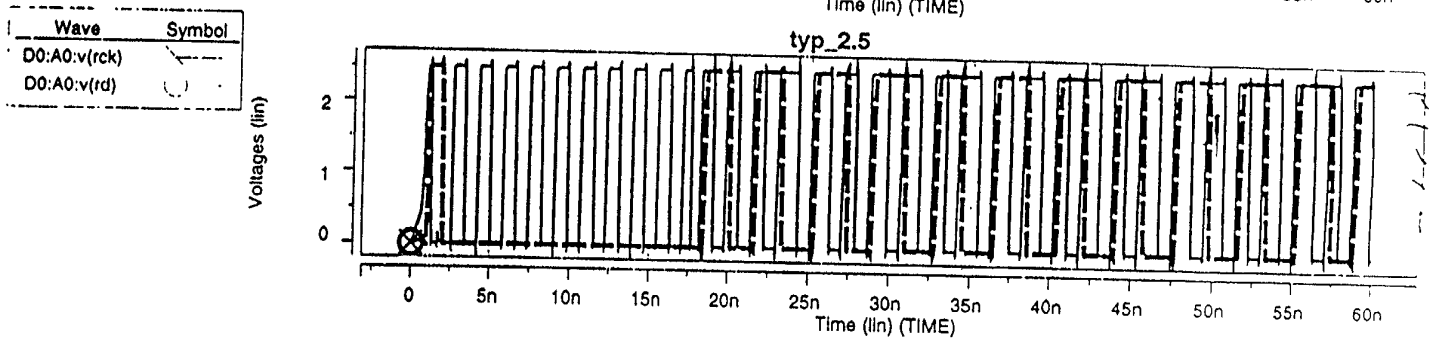


FIG 12d

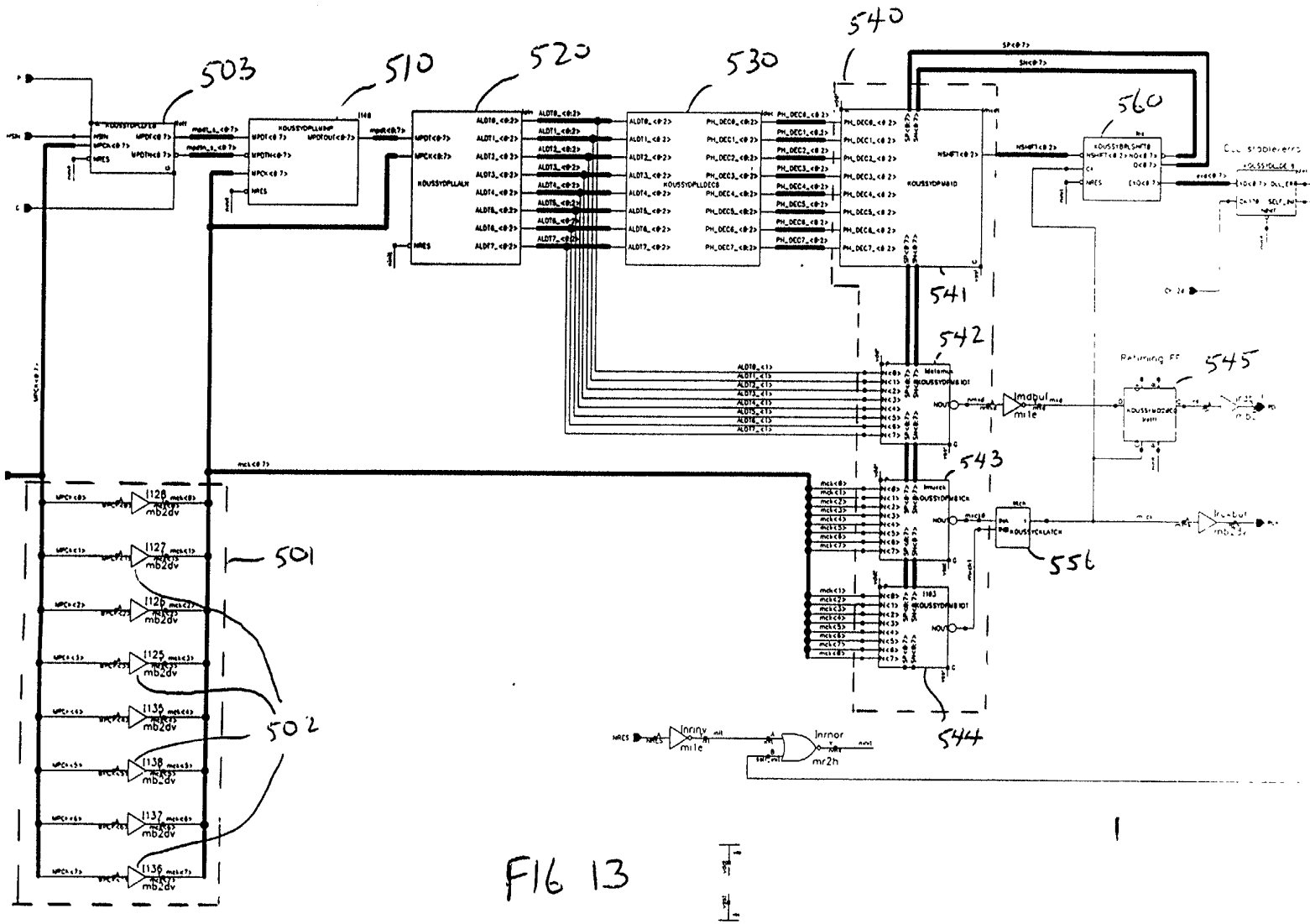


FIG 13

FIG. 14

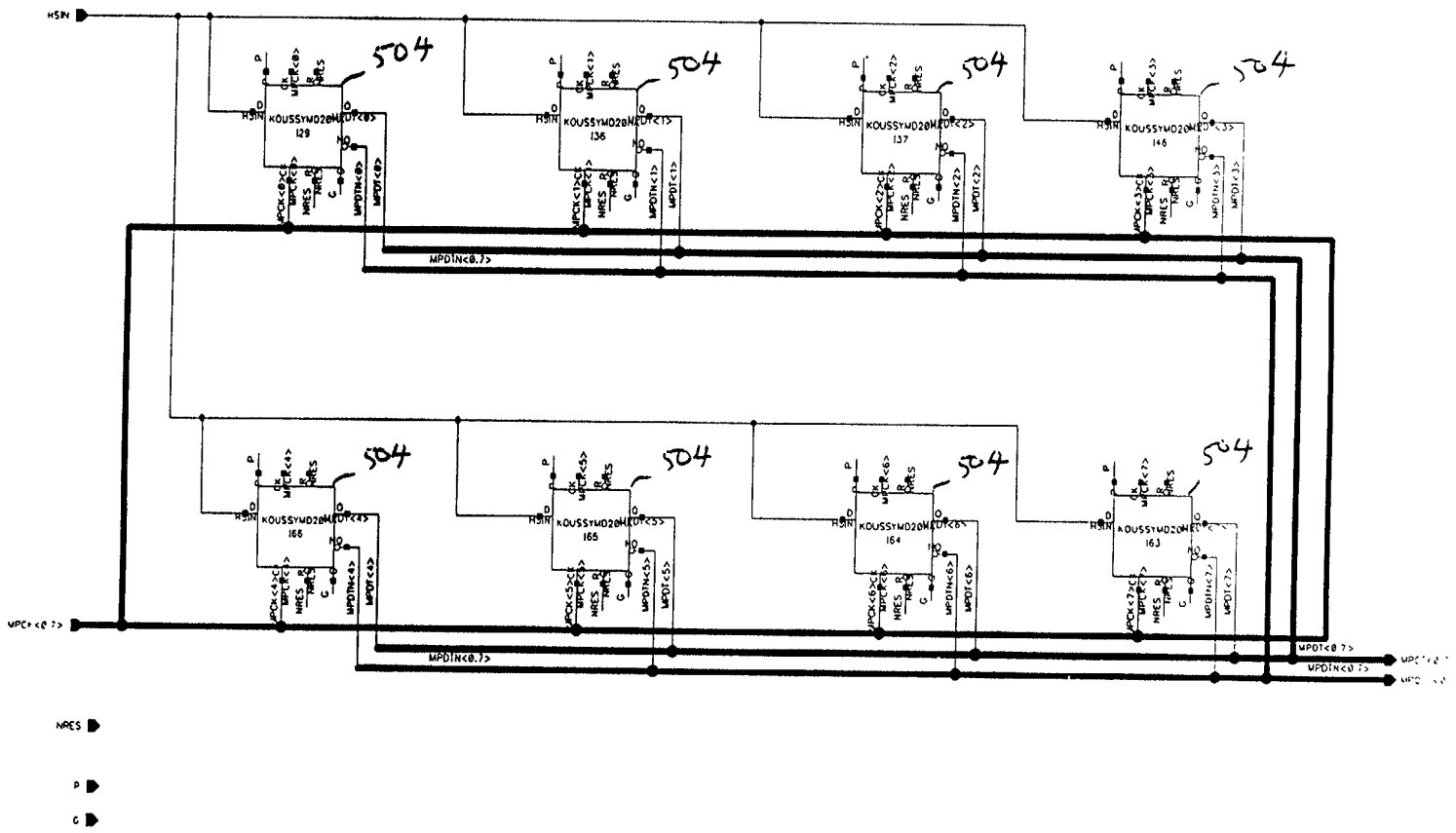
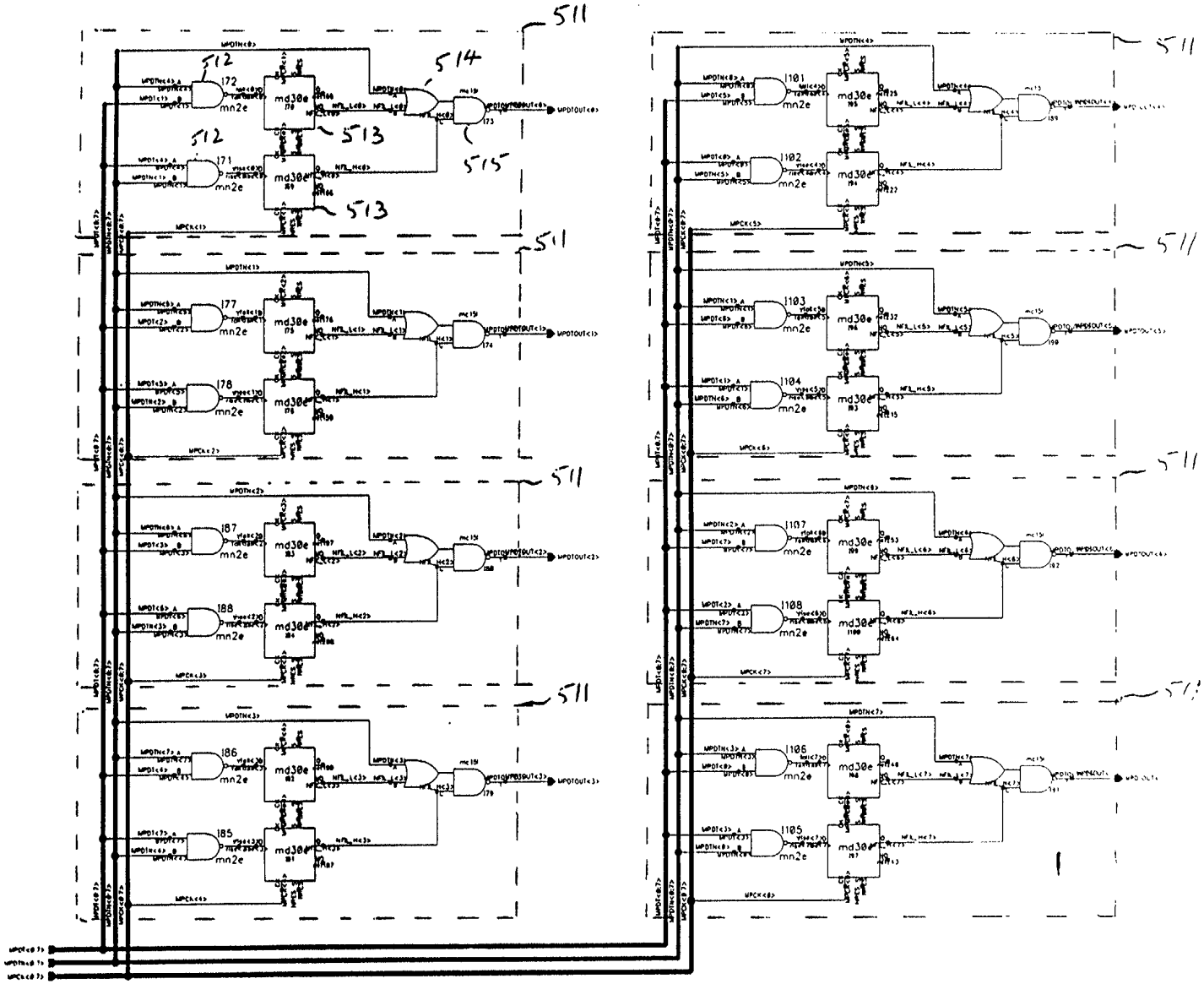


FIG. 15



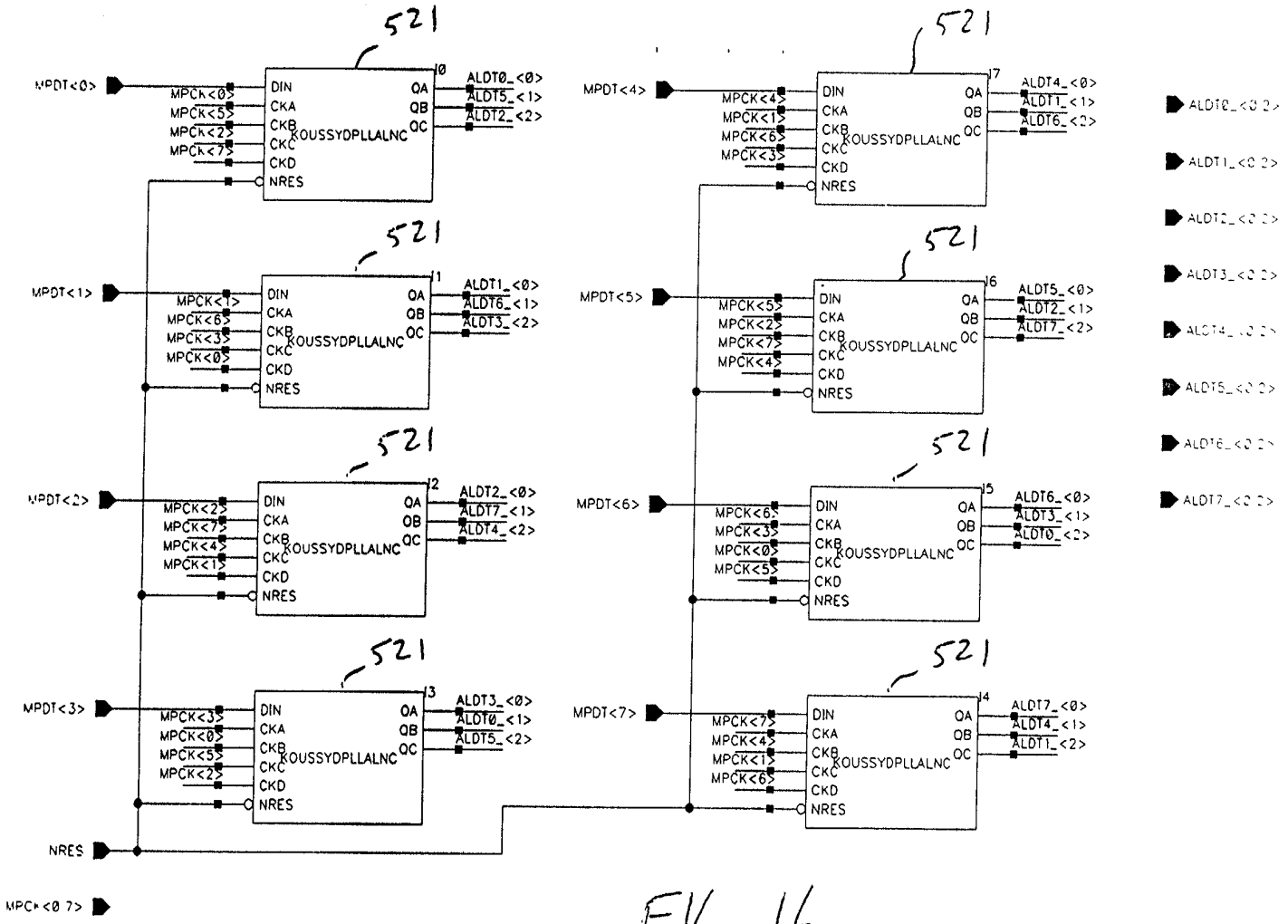

521
MPDT<0>
MPCK<0>
MPCK<5>
MPCK<2>
MPCK<7>
DIN
CKA
CKB
CKC
CKD
NRES
KOUSSYDPLLALNC
QA
QB
QC
ALDT0_<0>
ALDT5_<1>
ALDT2_<2>
MPDT<1>
MPCK<1>
MPCK<6>
MPCK<3>
MPCK<0>
ALDT1_<0>
ALDT6_<1>
ALDT3_<2>
MPDT<2>
MPCK<2>
MPCK<7>
MPCK<4>
MPCK<1>
ALDT2_<0>
ALDT7_<1>
ALDT4_<2>
MPDT<3>
MPCK<3>
MPCK<0>
MPCK<5>
MPCK<2>
ALDT3_<0>
ALDT0_<1>
ALDT5_<2>
NRES
MPDT<4>
MPCK<4>
MPCK<1>
MPCK<6>
MPCK<3>
ALDT4_<0>
ALDT1_<1>
ALDT6_<2>
MPDT<5>
MPCK<5>
MPCK<2>
MPCK<7>
MPCK<4>
ALDT5_<0>
ALDT2_<1>
ALDT7_<2>
MPDT<6>
MPCK<6>
MPCK<3>
MPCK<0>
MPCK<5>
ALDT6_<0>
ALDT3_<1>
ALDT0_<2>
MPDT<7>
MPCK<7>
MPCK<4>
MPCK<1>
MPCK<6>
ALDT7_<0>
ALDT4_<1>
ALDT1_<2>

FIG. 16

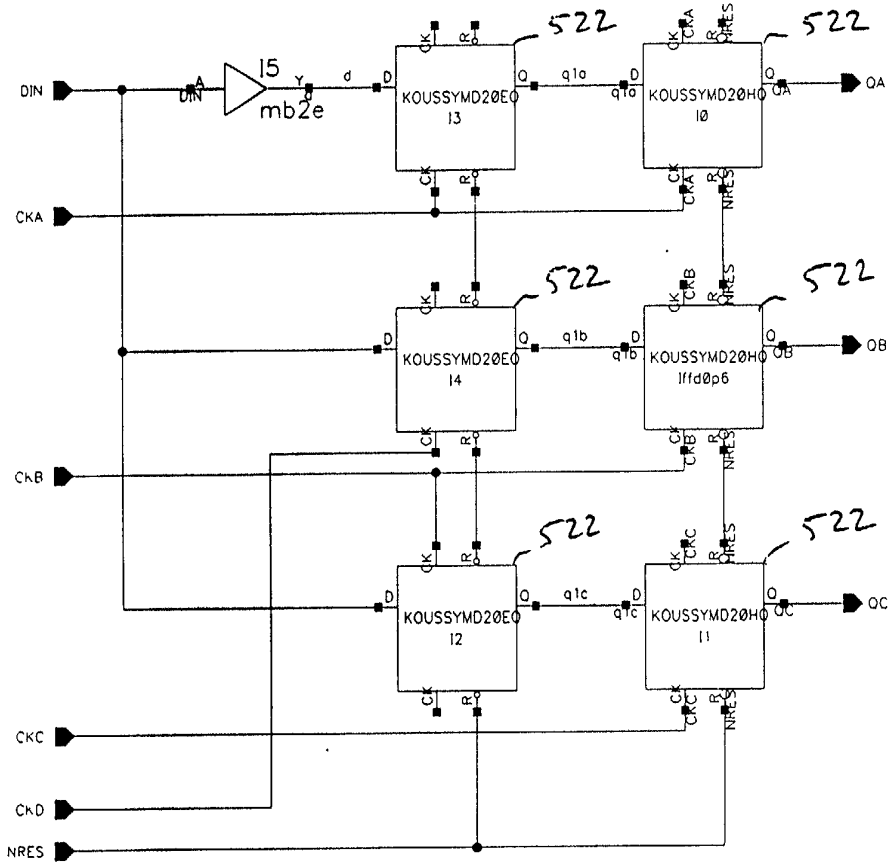

DIN
CKA
CKB
CKC
CKD
NRES
I5
mb2e
d
522
KOUSSYMD20EC
I3
KOUSSYMD20HC
I0
q1a
QA
KOUSSYMD20EC
I4
KOUSSYMD20HC
Iffd0p6
q1b
QB
KOUSSYMD20EC
I2
KOUSSYMD20HC
I1
q1c
QC

FIG. 17

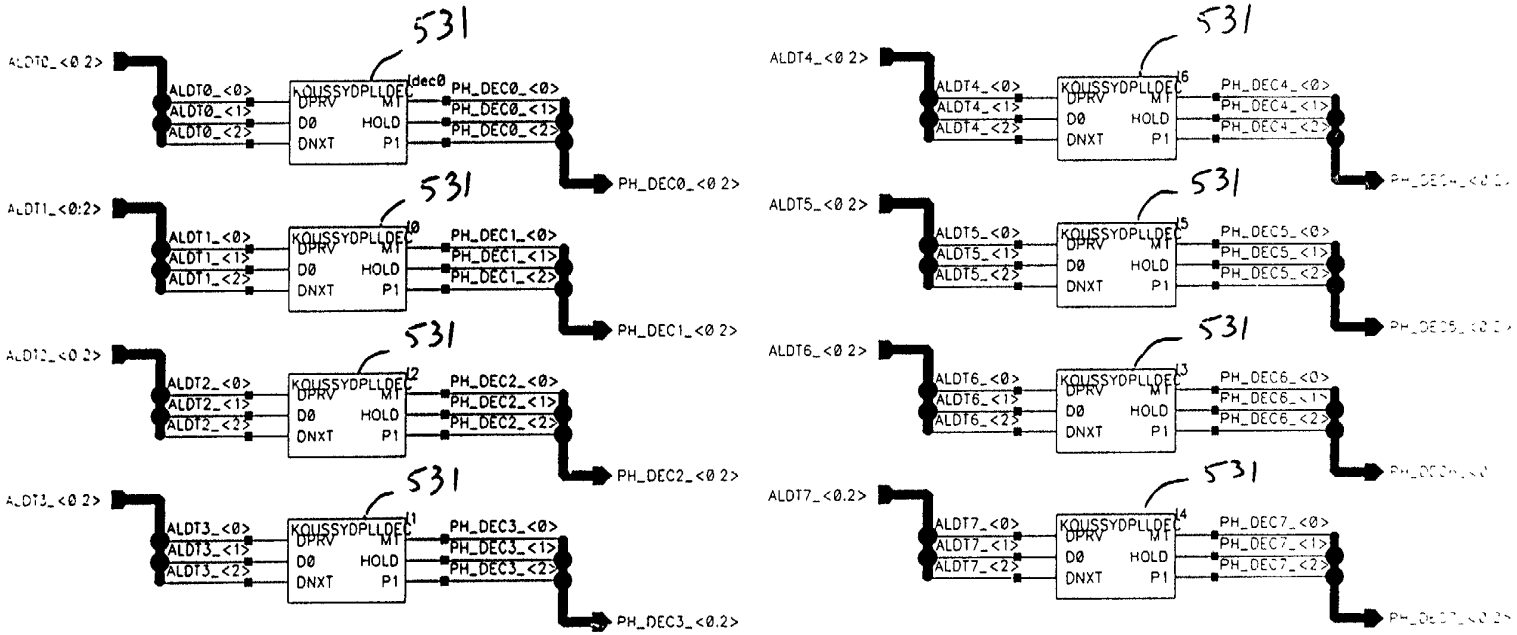

531
ALDT0_<0:2>
ALDT0_<0>
ALDT0_<1>
ALDT0_<2>
KOUSSYDPLLDEC
DPRV
MT
D0
HOLD
DNXT
P1
dec0
PH_DEC0_<0>
PH_DEC0_<1>
PH_DEC0_<2>
PH_DEC0_<0:2>
ALDT1_<0:2>
ALDT1_<0>
ALDT1_<1>
ALDT1_<2>
i0
PH_DEC1_<0>
PH_DEC1_<1>
PH_DEC1_<2>
PH_DEC1_<0:2>
ALDT2_<0:2>
ALDT2_<0>
ALDT2_<1>
ALDT2_<2>
i2
PH_DEC2_<0>
PH_DEC2_<1>
PH_DEC2_<2>
PH_DEC2_<0:2>
ALDT3_<0:2>
ALDT3_<0>
ALDT3_<1>
ALDT3_<2>
i1
PH_DEC3_<0>
PH_DEC3_<1>
PH_DEC3_<2>
PH_DEC3_<0:2>
ALDT4_<0:2>
ALDT4_<0>
ALDT4_<1>
ALDT4_<2>
i6
PH_DEC4_<0>
PH_DEC4_<1>
PH_DEC4_<2>
ALDT5_<0:2>
ALDT5_<0>
ALDT5_<1>
ALDT5_<2>
i5
PH_DEC5_<0>
PH_DEC5_<1>
PH_DEC5_<2>
ALDT6_<0:2>
ALDT6_<0>
ALDT6_<1>
ALDT6_<2>
i3
PH_DEC6_<0>
PH_DEC6_<1>
PH_DEC6_<2>
ALDT7_<0:2>
ALDT7_<0>
ALDT7_<1>
ALDT7_<2>
i4
PH_DEC7_<0>
PH_DEC7_<1>
PH_DEC7_<2>

FIG. 18

FIG. 19

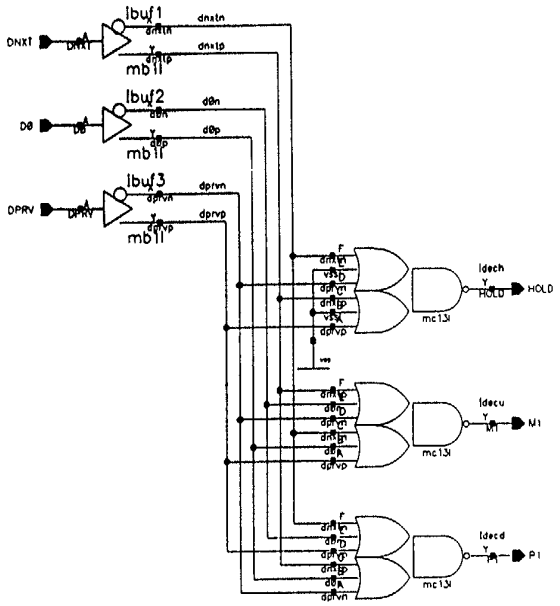


FIG 20

DPRV	D0	DNXT	M1	HOLD
H	H	L	H	L
L	L	H	L	H
H	H	H	L	H
L	L	L	H	L
H	H	L	H	L
L	L	H	L	H

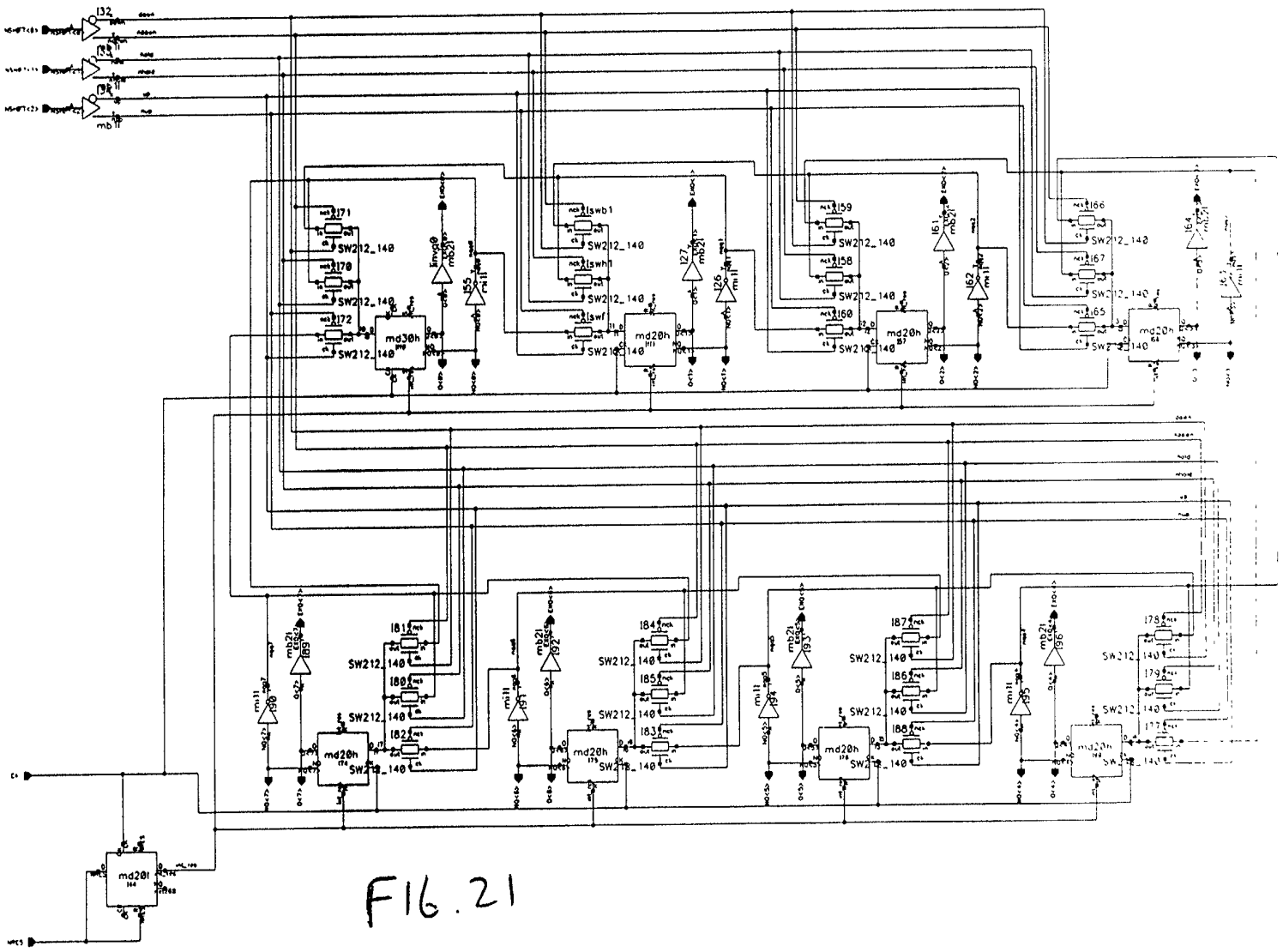


FIG. 21

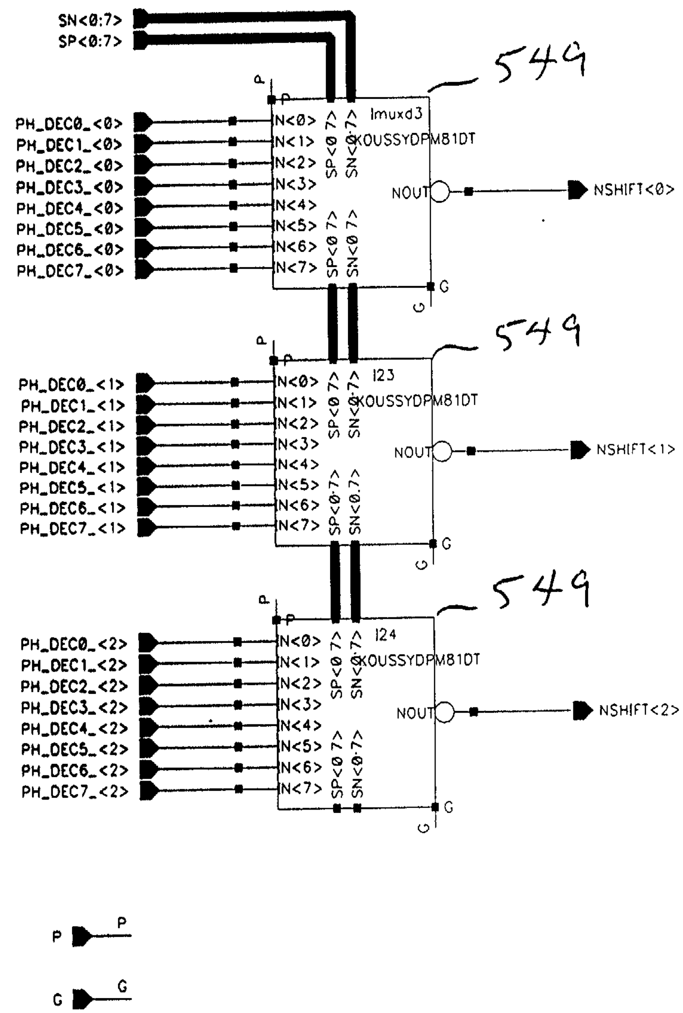

SN<0:7>
SP<0:7>
PH_DEC0_<0>
PH_DEC1_<0>
PH_DEC2_<0>
PH_DEC3_<0>
PH_DEC4_<0>
PH_DEC5_<0>
PH_DEC6_<0>
PH_DEC7_<0>
Imuxd3
KOUSSYDPM81DT
NOUT
NSHIFT<0>
549
PH_DEC0_<1>
PH_DEC1_<1>
PH_DEC2_<1>
PH_DEC3_<1>
PH_DEC4_<1>
PH_DEC5_<1>
PH_DEC6_<1>
PH_DEC7_<1>
I23
KOUSSYDPM81DT
NSHIFT<1>
549
PH_DEC0_<2>
PH_DEC1_<2>
PH_DEC2_<2>
PH_DEC3_<2>
PH_DEC4_<2>
PH_DEC5_<2>
PH_DEC6_<2>
PH_DEC7_<2>
I24
KOUSSYDPM81DT
NSHIFT<2>
549
P
G

FIG. 22

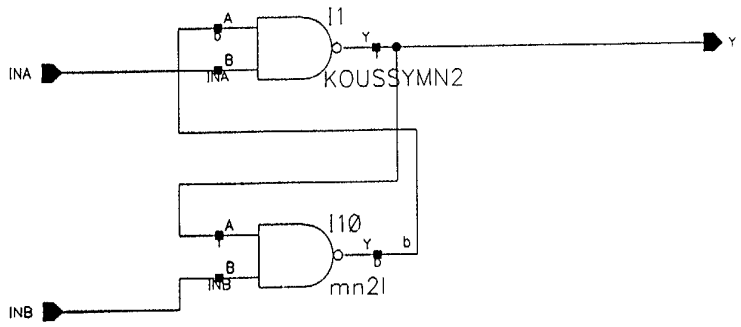


FIG. 23

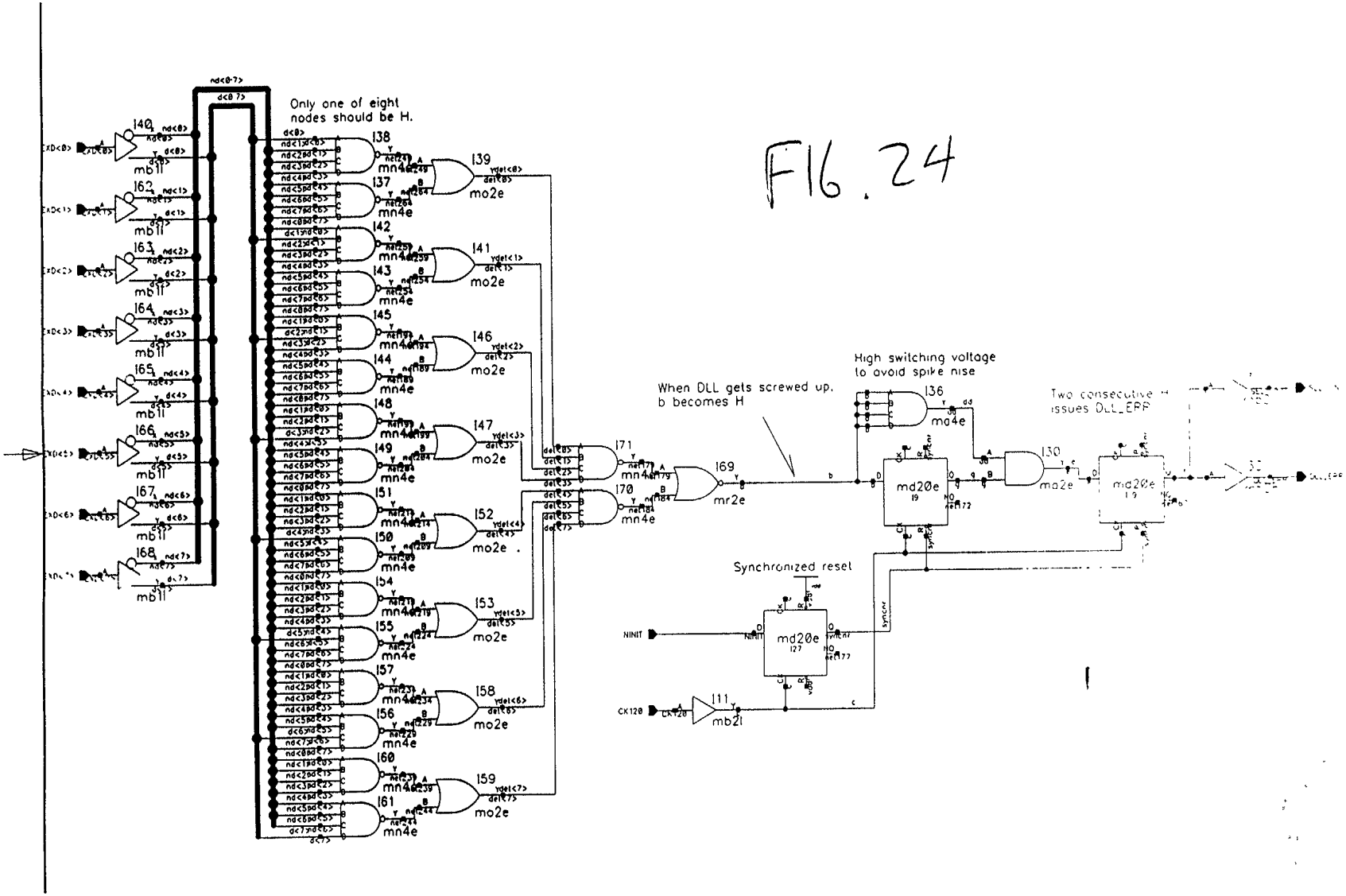


FIG. 24

FIG 25a

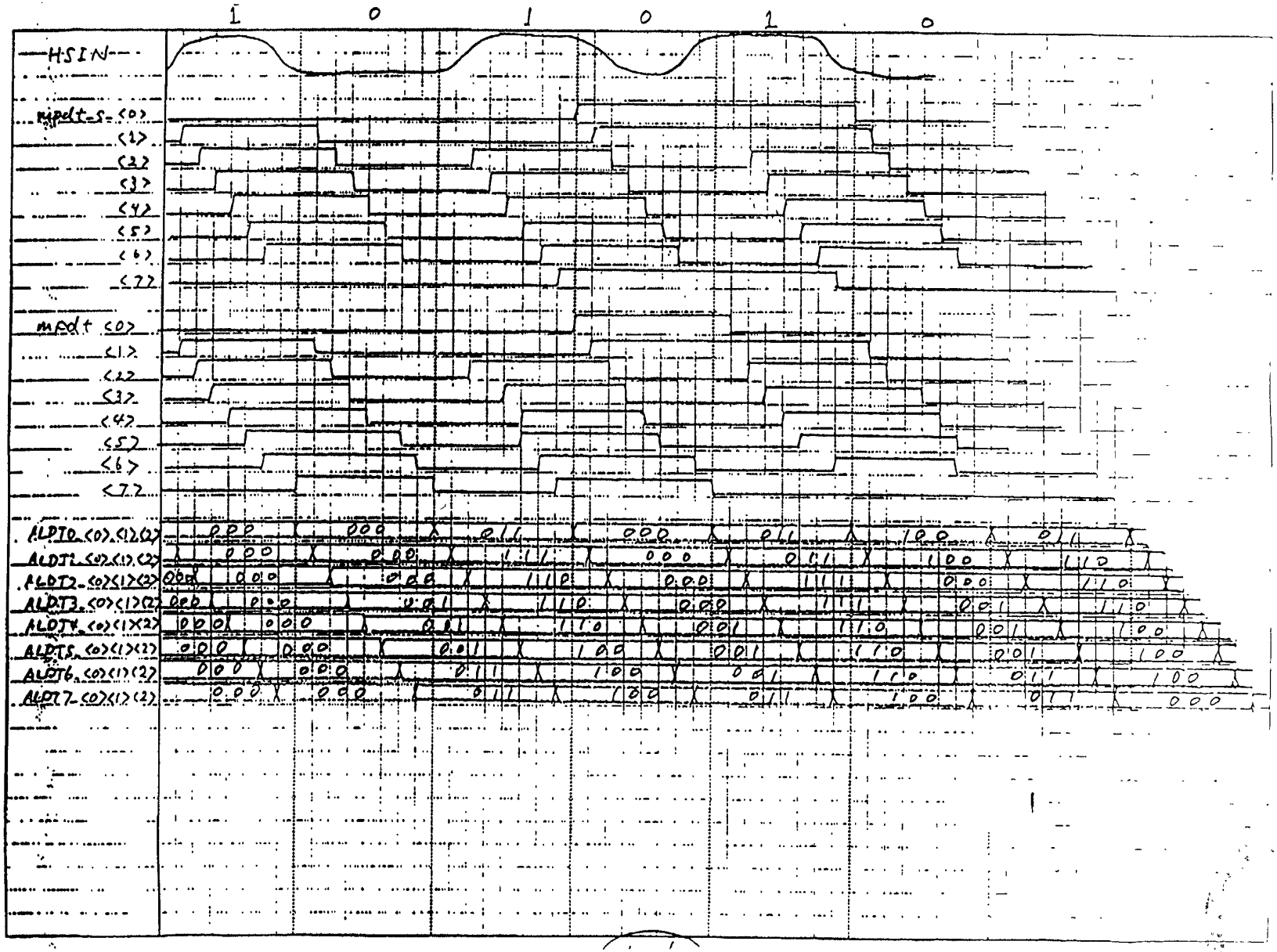


FIG. 25b

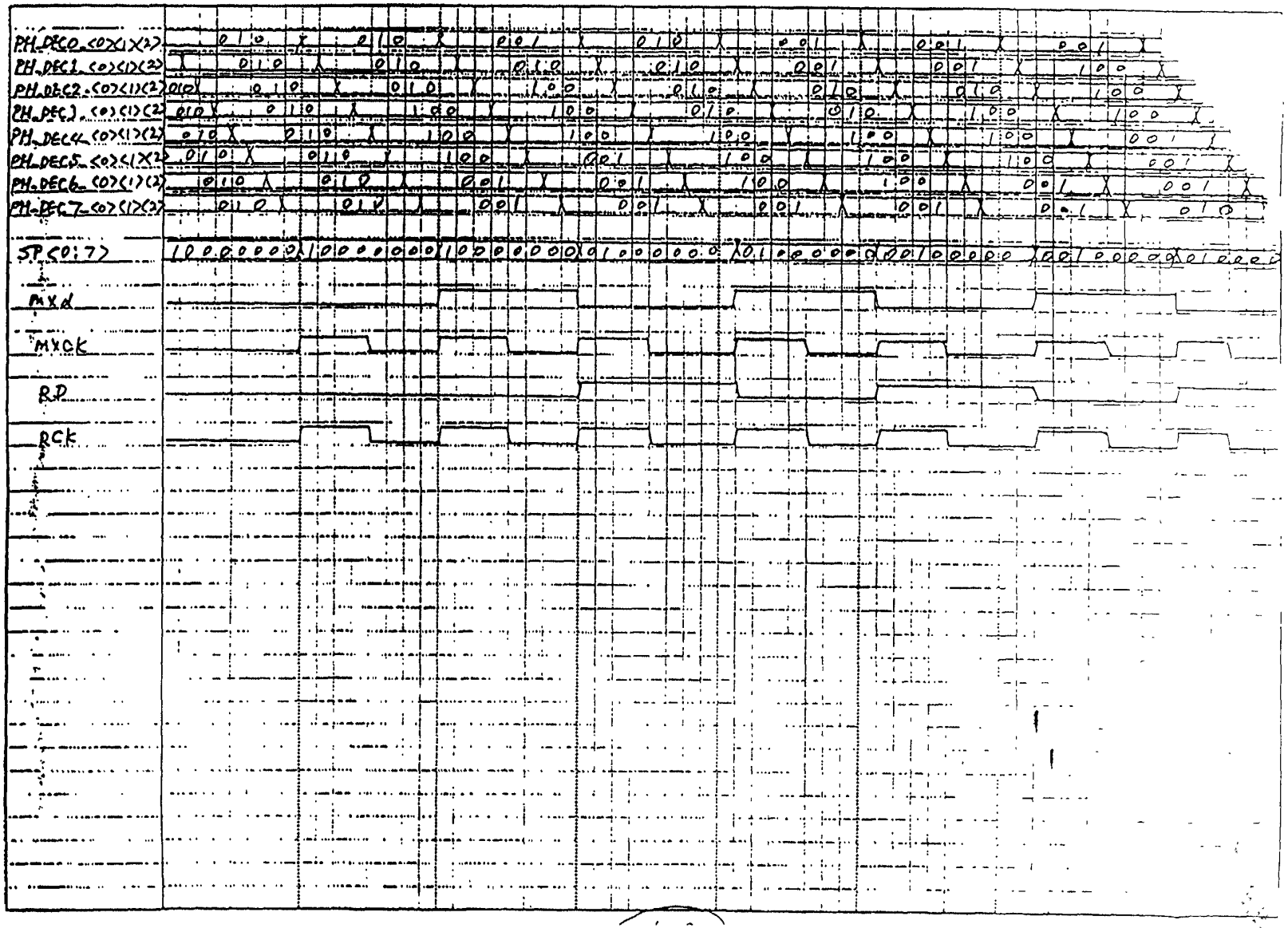

PH_DEC0_<0><1><2>
PH_DEC1_<0><1><2>
PH_DEC2_<0><1><2>
PH_DEC3_<0><1><2>
PH_DEC4_<0><1><2>
PH_DEC5_<0><1><2>
PH_DEC6_<0><1><2>
PH_DEC7_<0><1><2>
SP<0:7>
MXd
MXCK
RD
RCK

FIG. 25c

KOUSSYDPLLMINP

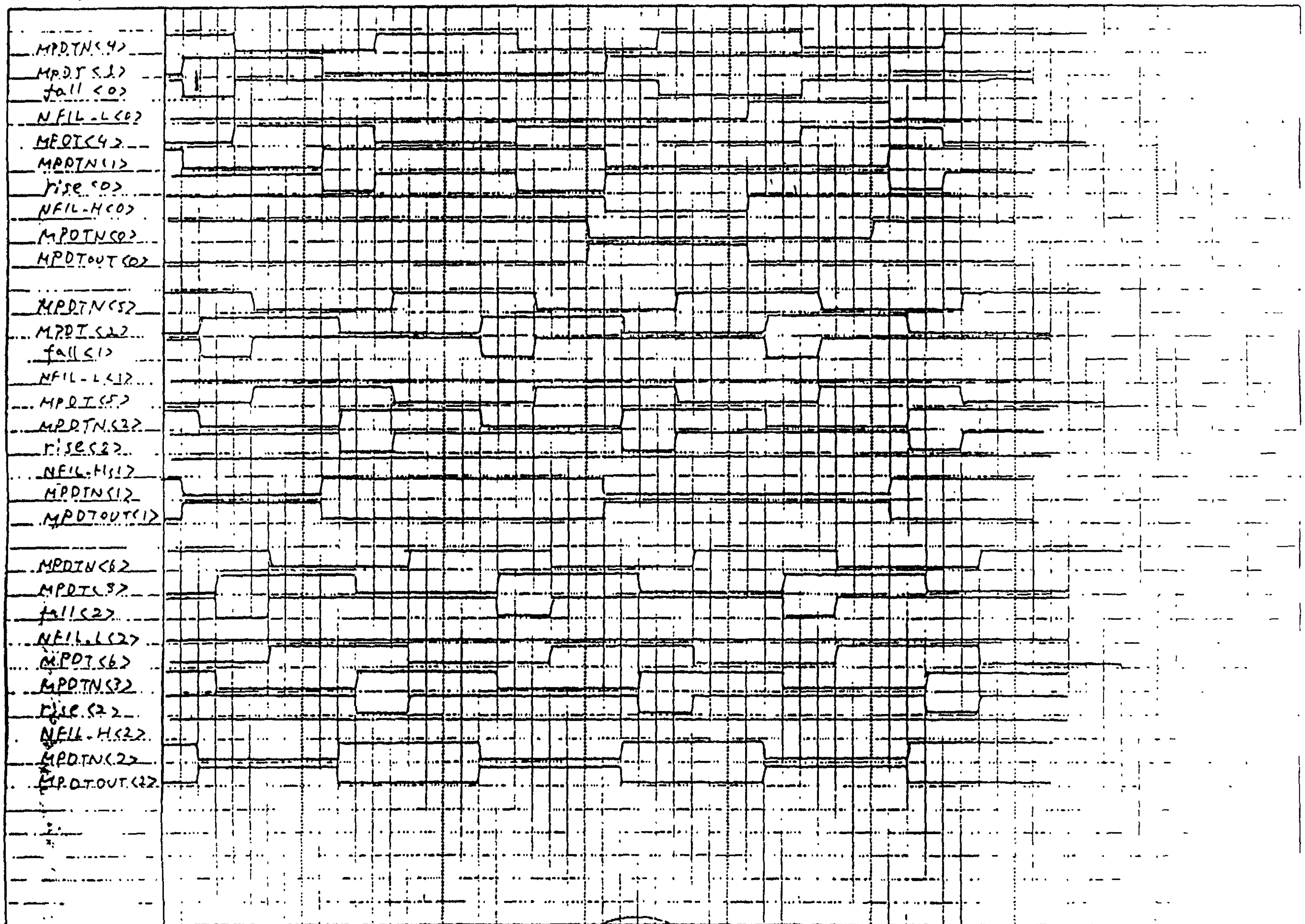


FIG. 25d

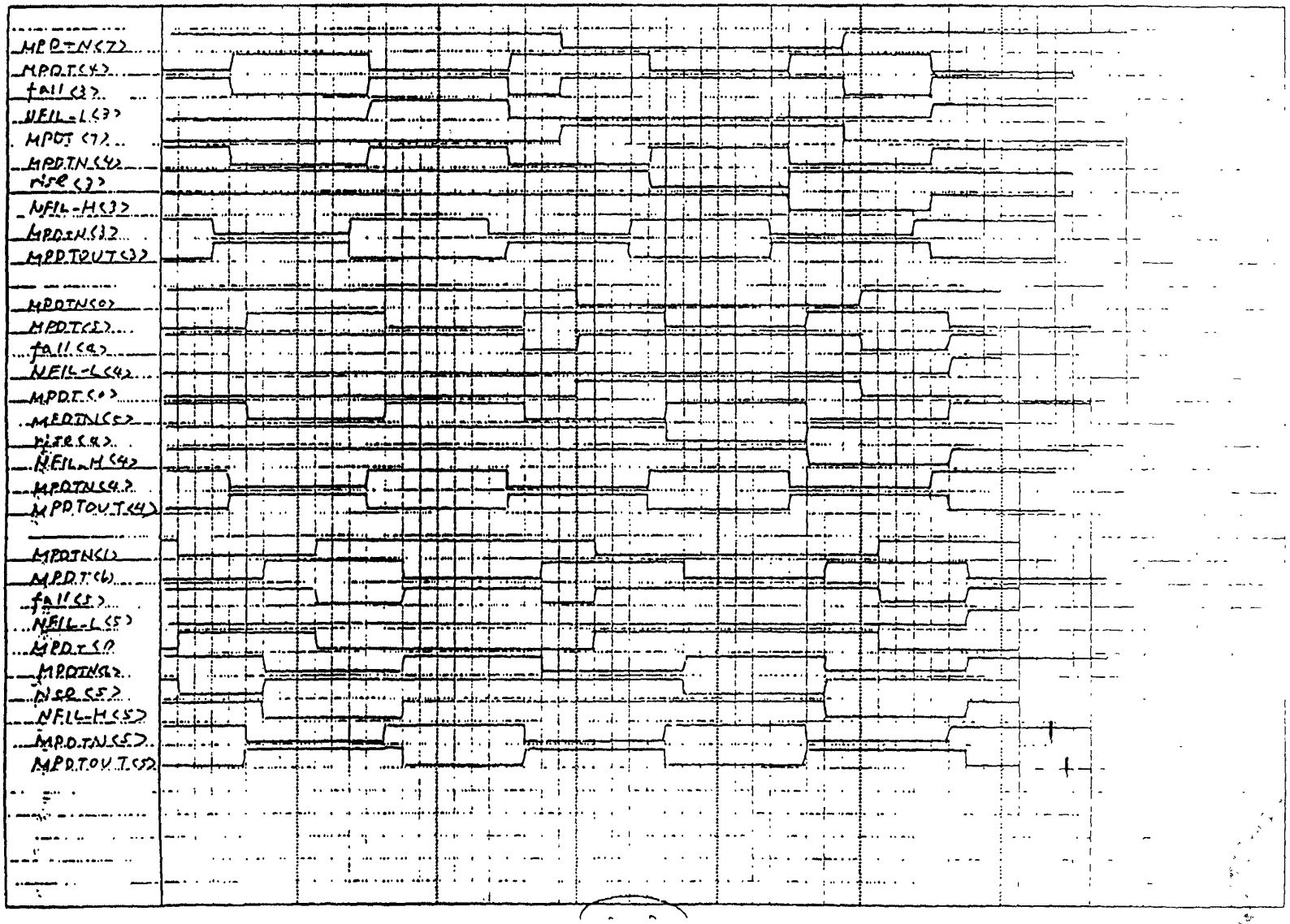

MPDTN<7>
MPDT<4>
fall<3>
NFIL-L<3>
MPDT<7>
MPDTN<4>
NSR<3>
NFIL-H<3>
MPDTN<3>
MPDTOUT<3>
MPDTN<0>
MPDT<5>
fall<4>
NFIL-L<4>
MPDT<0>
MPDTN<5>
NSR<4>
NFIL-H<4>
MPDTN<4>
MPDTOUT<4>
MPDTN<1>
MPDT<6>
fall<5>
NFIL-L<5>
MPDT<1>
MPDTN<2>
NSR<5>
NFIL-H<5>
MPDTN<5>
MPDTOUT<5>

FIG. 25e

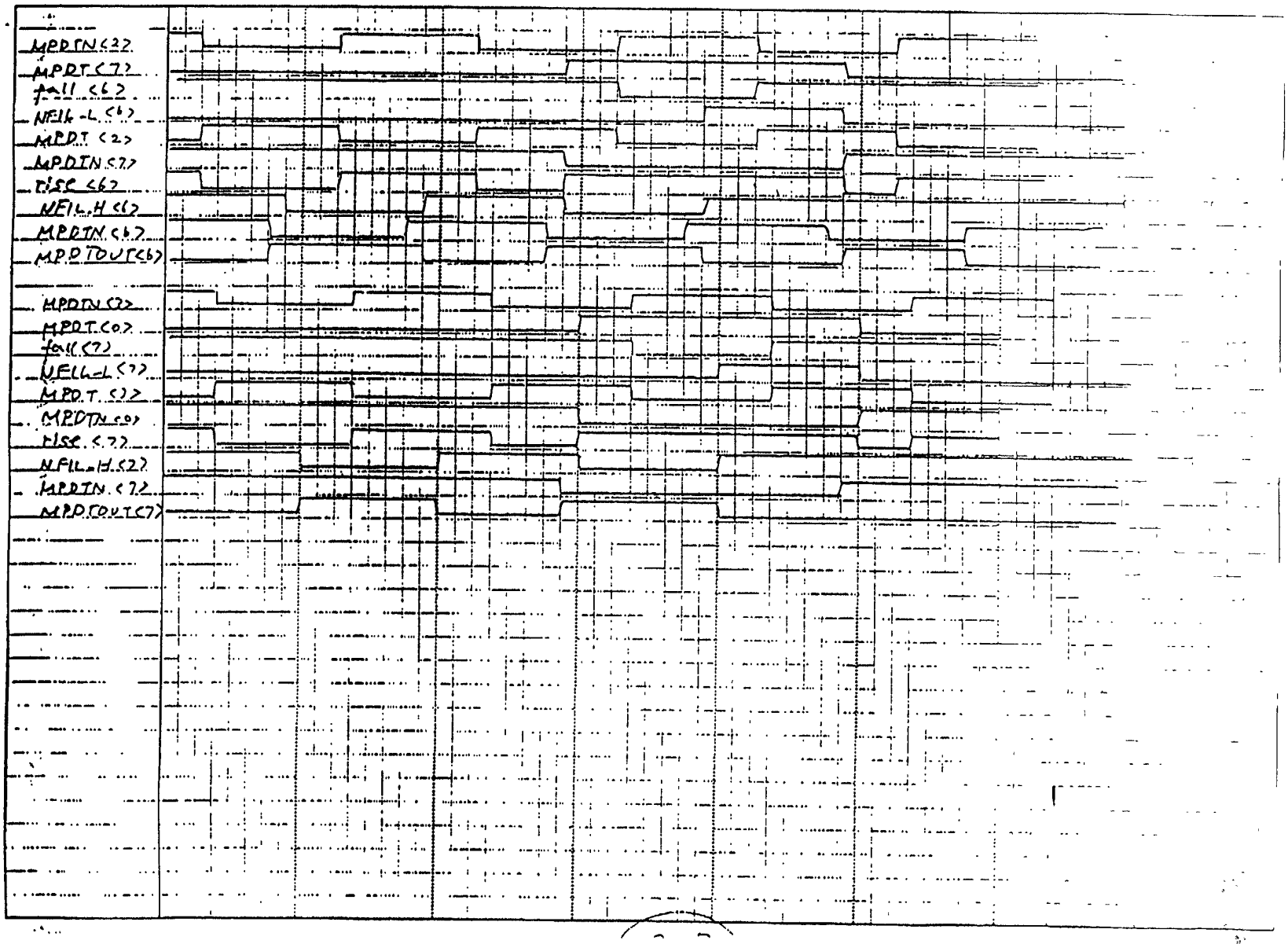


FIG. 25F

KOUSSYDPLLALN

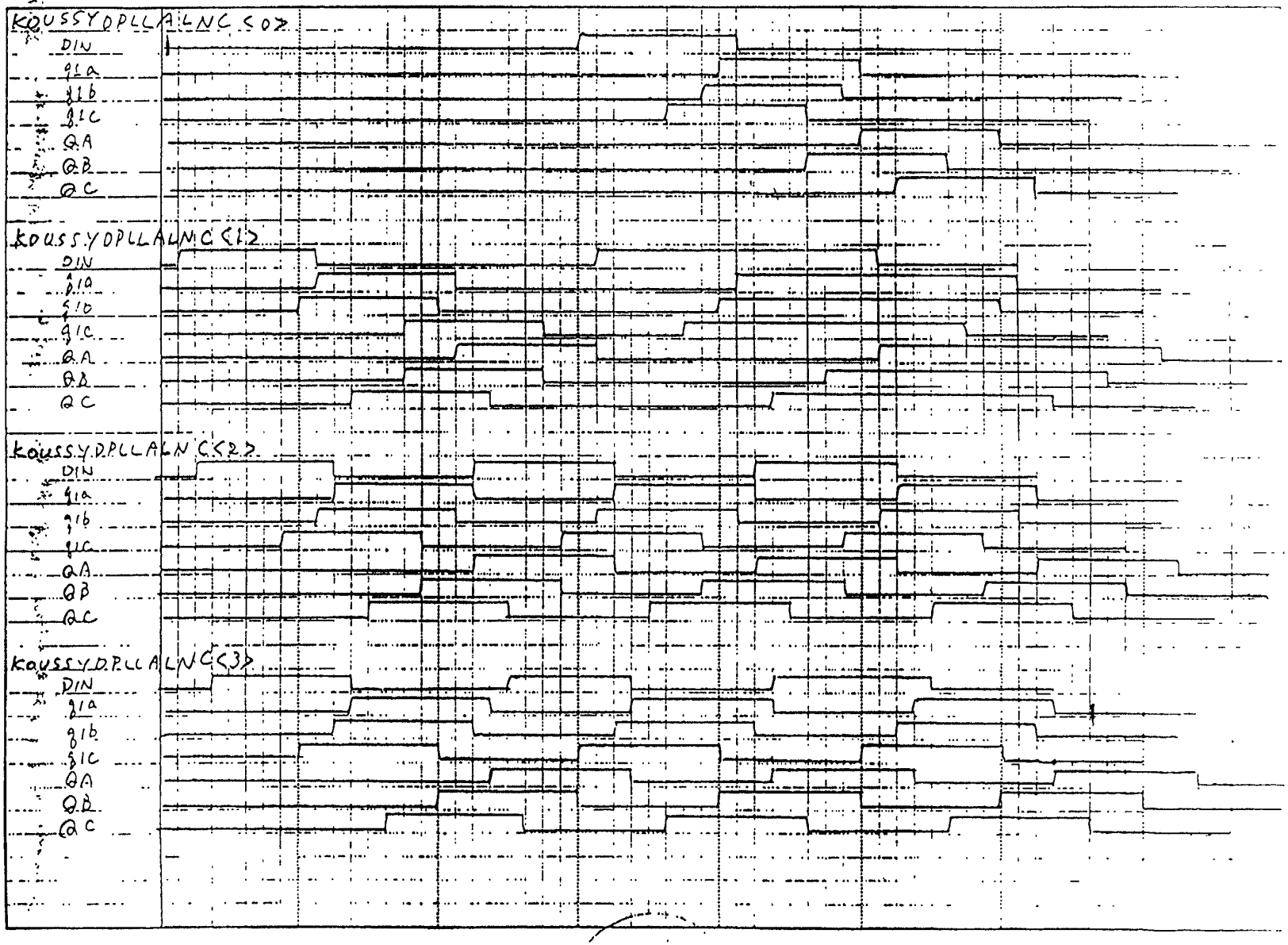
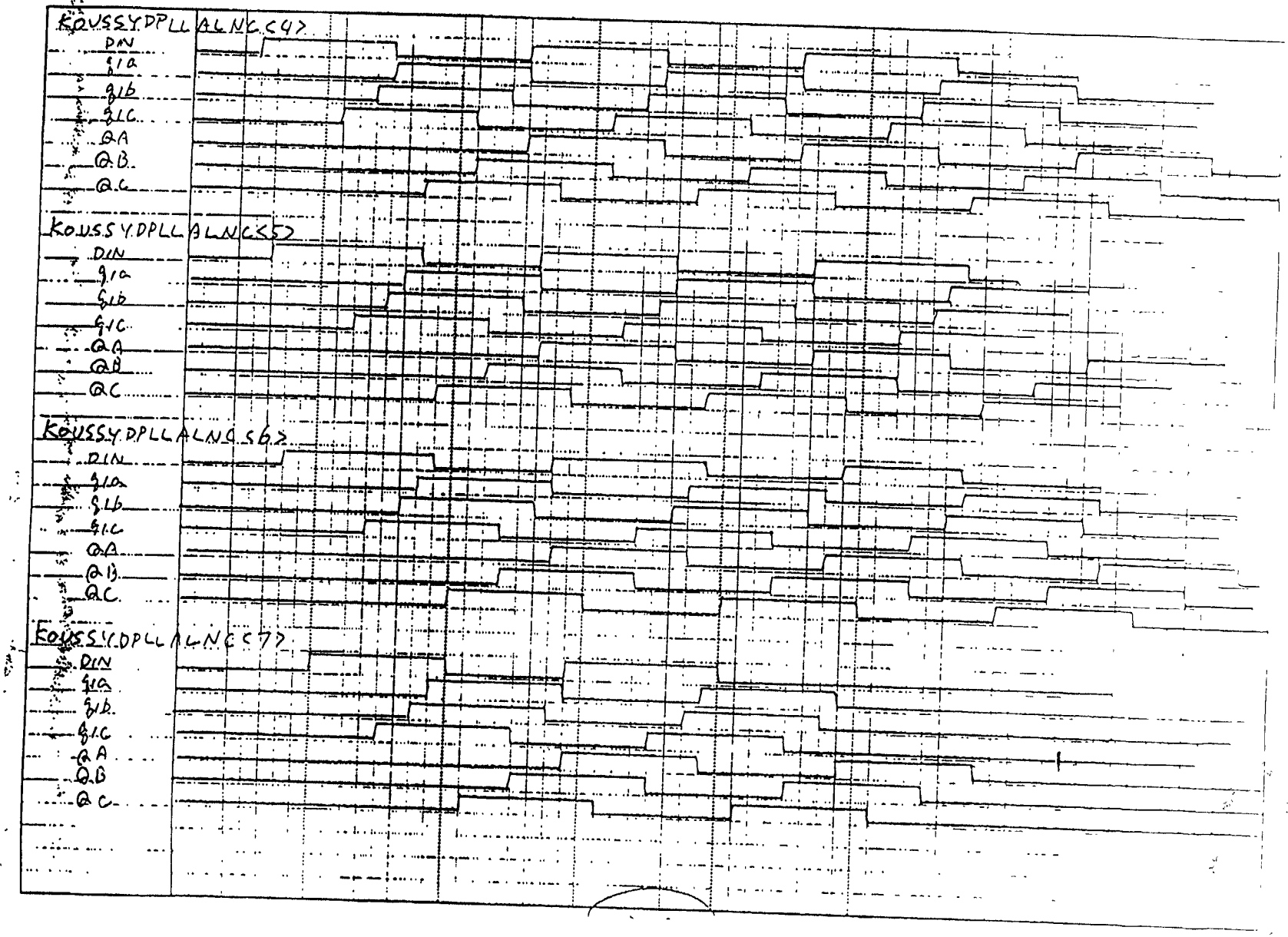


FIG. 25g



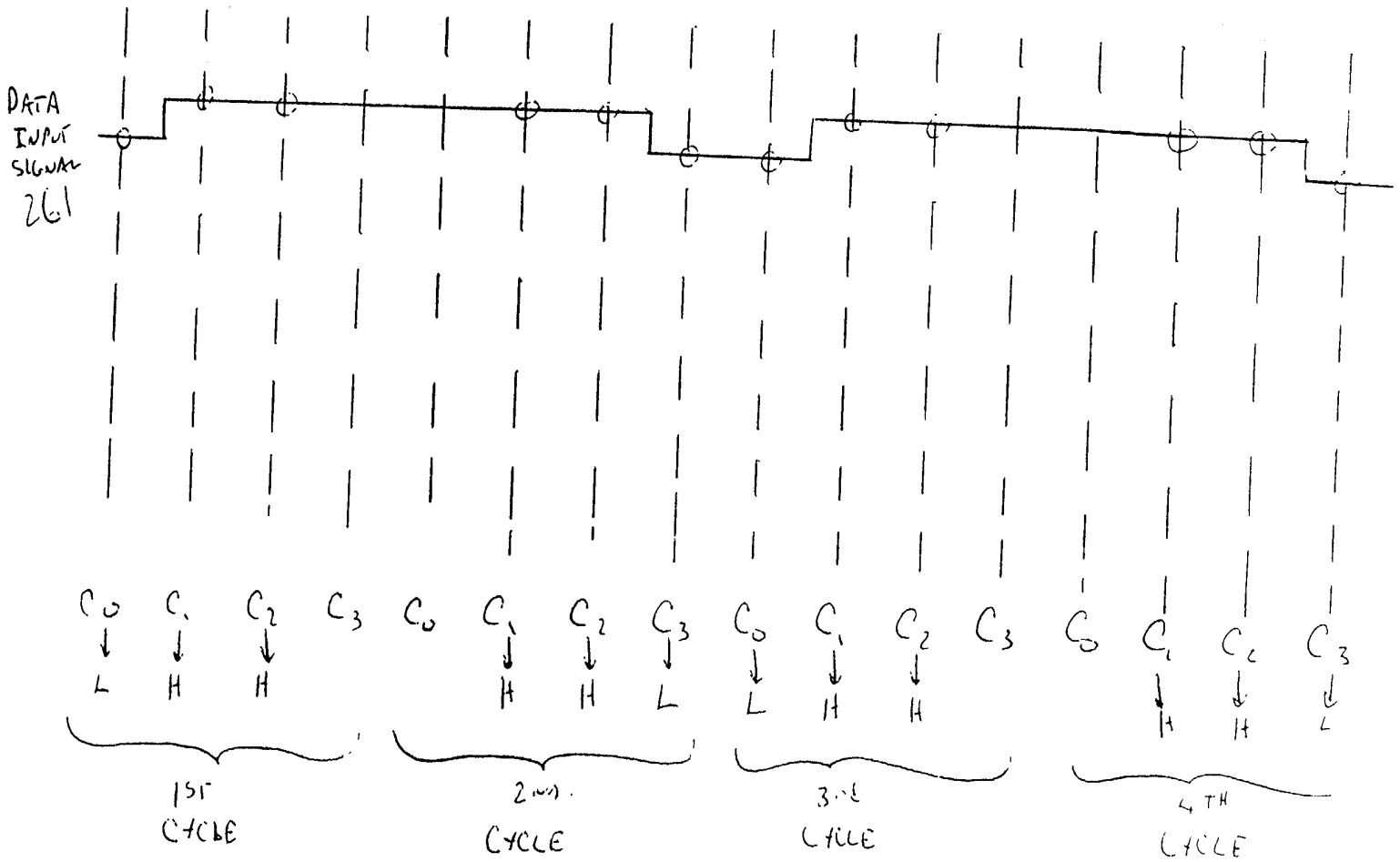

DATA
INPUT
SIGNAL
261
C0 C1 C2 C3
L H H
C0 C1 C2 C3
H H L
C0 C1 C2 C3
L H H
C0 C1 C2 C3
H H L
1ST
CYCLE
2ND
CYCLE
3RD
CYCLE
4TH
CYCLE

FIG. 26